



# Automatic Gauge Control

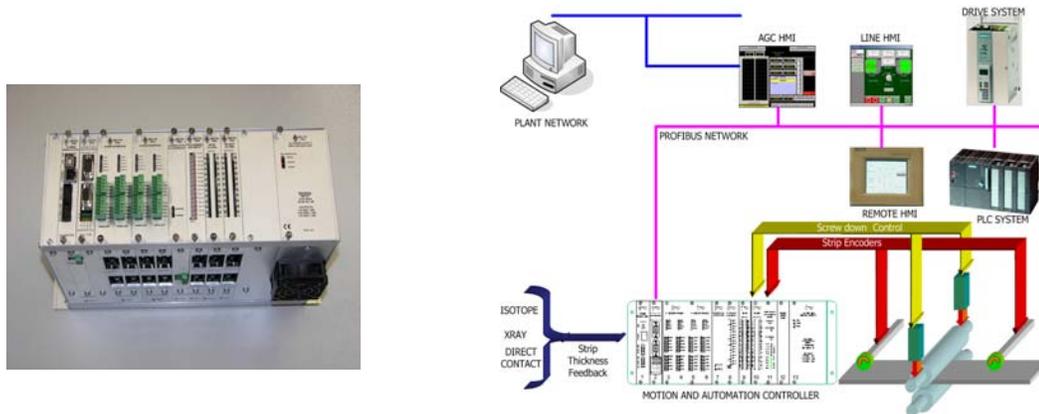
Walco's **NEW** AGC (Automatic Gauge Control) system has been developed with the latest technology using commercially available components and utilizing universal motion and automation controller. The heart of the new AGC system is an advanced **DSP** (Digital Signal Processor) motion control processor. This DSP processor performs all AGC calculations and provides the necessary analog and digital interfaces to the rolling mill. The DSP based system is connected to a host computer via a USB or Ethernet interface.

The basic AGC system utilizes the proven mass flow concept. It is, however, greatly enhanced with digital filtering and the inclusion of an entry gauge error feed-forward component. The AGC software also utilizes a rotary buffer for storing entry and exit length information.

All AGC calculations are performed on the DSP processor board. Due to the DSP's high processing throughput, it is possible to calculate a gauge error (incorrect thickness leaving the roll bite) every **0.001328 seconds**.

A major advantage of having the AGC program running on the DSP processor is that there is no delay in issuing a roll position correction. The DSP and screw-down motion controller are integrated resulting in no transport lag between resolving a gauge connection and initiating screw-down movement.

The universal motion and automation controller allows both system flexibility, scalability and serviceability.



## The DSP processor performs the following actions:

- Mass Flow & Feedback AGC
- Closes the position loop on the hydraulic cylinder(s)
- Feed-forward component to the final AGC correction
- Low pass, high pass and anti-alias filtering of AGC component signals
- Gathering of all quality control information required by the host PC
- Multi-step mill auto-stop algorithm
- Variable mill speed defect tracking (multi-point slowdown)
- Left and right winder wrap counters
- Rolling force calculation
- Gather all analog channels and perform required unit scaling
- Gather all digital inputs and de-bounce signals
- Operator's manual control of roll position system cylinders via the joystick
- Roll position system cylinders close to force calculations and operation
  - Auto leveling of screw-downs
- All rotary encoder integrity tests (including wrong encoder counts, missing A or B channel, improper channel phasing, and over-frequency)
- "DSP processor" to "host computer" USB or Ethernet communication